

EM Drive Lubricators

3A0415D
ENG

Provides a continuous, precise and temperature independent supply of grease or oil lubrication to all lubrication points of sliding- and roller bearings, drive- and transport chains, sliding guideways, open gears and seals. For professional use only.

Not approved for use in European explosive atmospheres.

75 psi (0.5 MPa, 5 bar) Maximum Working Pressure



Important Safety Instructions

Read all warnings and instructions in this manual. Save these instructions.

This equipment is suitable for use in Class I, Division 2, Groups A, B, C and D, Class II, Division 2, Groups F and G and Class III Hazardous Locations or non-hazardous locations only.

WARNING



EXPLOSION HAZARD





Substitution of components may impair suitability for Class I, Division 2.



BAYZ, BAYZ7
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Warnings

The following warnings are for the setup, use, grounding, maintenance, and repair of this equipment. The exclamation point symbol alerts you to a general warning and the hazard symbols refer to procedure-specific risks. When these symbols appear in the body of this manual, refer back to these Warnings. Product-specific hazard symbols and warnings not covered in this section may appear throughout the body of this manual where applicable.

 WARNING	
	<p>FIRE AND EXPLOSION HAZARD</p> <p>When flammable fluids are present in the work area, such as gasoline and windshield wiper fluid, be aware that flammable fumes can ignite or explode. To help prevent fire and explosion:</p> <ul style="list-style-type: none">• Use equipment only in well ventilated area.• Eliminate all ignition sources, such as cigarettes and portable electric lamps.• Keep work area free of debris, including rags and spilled or open containers of solvent and gasoline.• Do not plug or unplug power cords or turn lights on or off when flammable fumes are present.• Ground all equipment in the work area.• Use only grounded hoses.• If there is static sparking or you feel a shock, stop operation immediately. Do not use equipment until you identify and correct the problem.• Keep a working fire extinguisher in the work area.
	<p>TOXIC FLUID OR FUMES HAZARD</p> <p>Toxic fluids or fumes can cause serious injury or death if splashed in the eyes or on skin, inhaled, or swallowed.</p> <ul style="list-style-type: none">• Read MSDSs to know the specific hazards of the fluids you are using.• Store hazardous fluid in approved containers, and dispose of it according to applicable guidelines.
	<p>PRESSURIZED EQUIPMENT HAZARD</p> <p>Fluid from the equipment, leaks, or ruptured components can splash in the eyes or on skin and cause serious injury.</p> <ul style="list-style-type: none">• Follow the Pressure Relief Procedure before cleaning, checking, or servicing equipment.• Tighten all fluid connections before operating the equipment.• Check hoses, tubes, and couplings daily. Replace worn or damaged parts immediately.

! WARNING



EQUIPMENT MISUSE HAZARD

Misuse can cause death or serious injury.



- Do not operate the unit when fatigued or under the influence of drugs or alcohol.
- Do not exceed the maximum working pressure or temperature rating of the lowest rated system component. See **Technical Data** in all equipment manuals.
- Use fluids and solvents that are compatible with equipment wetted parts. See **Technical Data** in all equipment manuals. Read fluid and solvent manufacturer's warnings. For complete information about your material, request MSDS from distributor or retailer.
- Turn off all equipment and follow the **Pressure Relief Procedure** when equipment is not in use.
- Check equipment daily. Repair or replace worn or damaged parts immediately with genuine manufacturer's replacement parts only.
- Do not alter or modify equipment.
- Do not puncture, open or take lubricator apart.
- Use equipment only for its intended purpose. Call your distributor for information.
- Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces.
- Do not kink or over bend hoses or use hoses to pull equipment.
- Keep children and animals away from work area.
- Comply with all applicable safety regulations.

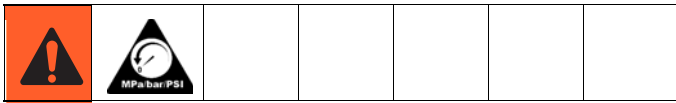


PERSONAL PROTECTIVE EQUIPMENT

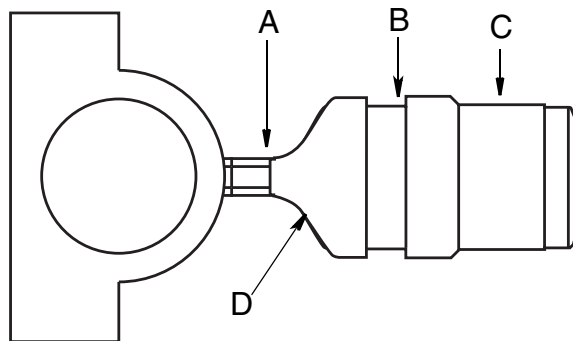
You must wear appropriate protective equipment when operating, servicing, or when in the operating area of the equipment to help protect you from serious injury, including eye injury, hearing loss, inhalation of toxic fumes, and burns. This equipment includes but is not limited to:

- Protective eyewear, and hearing protection.
- Respirators, protective clothing, and gloves as recommended by the fluid and solvent manufacturer.

Pressure Relief Procedure

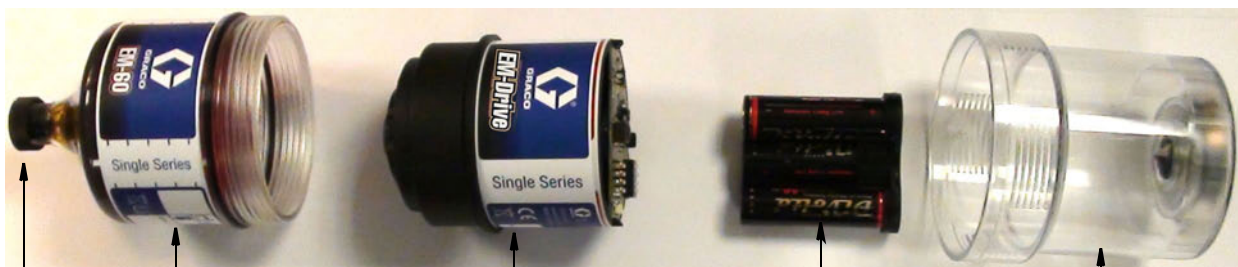


1. Cover lubrication point (A) and lubricator (B) with a heavy rag to absorb any fluid that may leak out while loosening the adapter.
2. Carefully unscrew support adapter (D) from the lubrication point (A).



- A Lubrication Point
- B Lubrication Canister
- C Drive Unit
- D Support Adapter

Component Identification



- A Plug
- B Lubrication Canister
NOTE: Canister cannot be refilled.
- C † Drive Unit (Includes gear motor and circuit board)

- D ◆ battery pack (includes 3 size AA batteries, each 1.5V)
- E † Cover

- ◆ New batteries must be used for every lubrication cartridge replacement. Never reuse batteries.
- † Reusable part

Installation and Setup

Determining Correct Mounting Method

NOTE:

- Direct mounting should be used for lubrication points that are easily accessible.
- Remote mounting is recommended if you answer **YES** to any of the questions below.

1. Is the ambient temperature at the lubrication point higher than +40°C (104°F)?
2. Is it necessary to remove protective screens, walls or other types of protection in order to reach the lubrication point?
3. Is the lubrication point exposed to high vibrations?
4. Is it difficult to access the lubrication point during operation of the machine?
5. Is the lubrication point exposed to any of the following:
 - water jets for high-pressure cleaning machines?
 - corrosive chemicals?
 - high temperatures?
 - falling materials?

Preparing Lubricator for Installation

The lubricator has a self-protection mechanism which shuts off the drive unit at counter pressures higher than 5 bar (72.5 psi). Most bearings require 0.5 - 2 bar (7.2 to 29 psi) pressure (without tubes, extensions, angles, etc.).

Use the following procedure to check the counter pressure of the application prior to installation.

NOTE:

- Be sure to use a lubricant cartridge that contains the same grease used in the application.
- The best measurement results are achieved during operation.

Checking the Counter Pressure

1. Clean the lubrication point to remove any potential contaminants.
2. Prime the grease line and all accessories with the same grease that is contained in the lubricator (See Parts, page 16 for a complete list of available grease cartridges).
3. Remove the plug (A).



4. Install lubricator unit into adapter (B).
5. Install reducers, extensions, grease line, etc. (if necessary).
6. Screw a pressure manometer into the lubrication point (*dd*) (FIG. 1, page 6).



A pressure manometer is a simple device that measures pressure output. To build a pressure manometer you need a pressure gage (*aa*), tee fitting (*bb*) and stop valve (*cc*). FIG. 1 shows a correctly assembled pressure manometer, connected to the lubricator and a lubrication point.

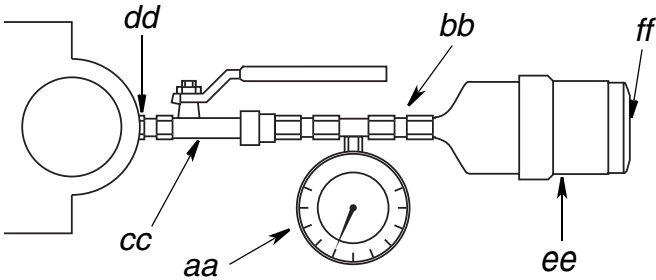
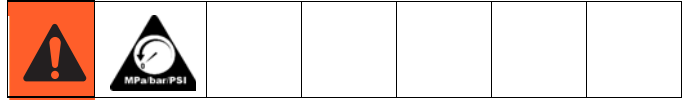


FIG. 1

- aa* Pressure Gauge
- bb* Tee Fitting
- cc* Stop Valve
- dd* Lube Point
- ee* Lubricator
- ff* ON / OFF Switch

7. Ensure the stop valve (*cc*) of the pressure manometer is open.
8. Attach lubricator and adapter (B) to the pressure manometer (*aa* - *cc*) and turn the switch to "ON" (*ff*) (FIG. 1).
9. Run the manometer for about 20 seconds. Observe the gauge and repeat this procedure until the pressure registered on the gauge stays constant.
10. To determine the counter pressure, wait approximately 5 minutes until the system has relaxed. Do one more discharge by turning the unit OFF; then ON again until it dispenses for **no more than 5 seconds**.
11. Wait approximately 5 more minutes to make sure the system does not lose pressure and remains constant.



12. To disconnect lubricator from manometer, follow **pressure relief procedure** provided **on** page 4.

NOTE: In this application, you will be disconnecting adapter (B) from manometer instead of lubrication point.

NOTICE

Do NOT disconnect lubricator from adapter (B). Screwing anything into lubricator end a second time will damage self-sealing threads.

13. If the counter pressure is 5 bar (72.5 psi) or higher, flush the lubrication point with a grease gun.

If the counter pressure does not decrease you may need a different lubricant or size lubricator canister. Contact Graco Customer service for assistance.

Priming/Prefilling Fittings and Grease Lines

All accessories and grease lines must be primed/pre filled. Without this priming/pre filling, the lubricator would first have to fill the accessories with lubricant.

Example: A tube that is one meter long requires about 28 cm³ of lubricant. It would take the lubricator with a 12 month setting and an EM-120 grease canister about 3 months to fill this 1 meter tube.

FIG. 2 illustrates one way to pre fill using a grease gun to dispense the grease.



FIG. 2

Circuit Board Settings

Function Display

Red and green LED's (Light Emitting Diodes) are on the circuit board and visible through the transparent cover. The following signals about operating conditions/malfunctions are displayed by these LED's for the user:

LED	Signal	Signal Time	Meaning
Green	Blinking	Every 15 seconds	System functions OK
Red	Blinking	Every 8 seconds	Malfunction / error
Green and Red	Blinking	Every 3 seconds	Lubricator unit is empty. Change canister.
Red	Steady signal	Steady	Unit is discharging lubricant.

There is a 4-way code switch on the circuit board. TIME switches 1 + 2 are used to set the discharge period. VOL switches 3 + 4 are used to set the size of the lubrication canister.

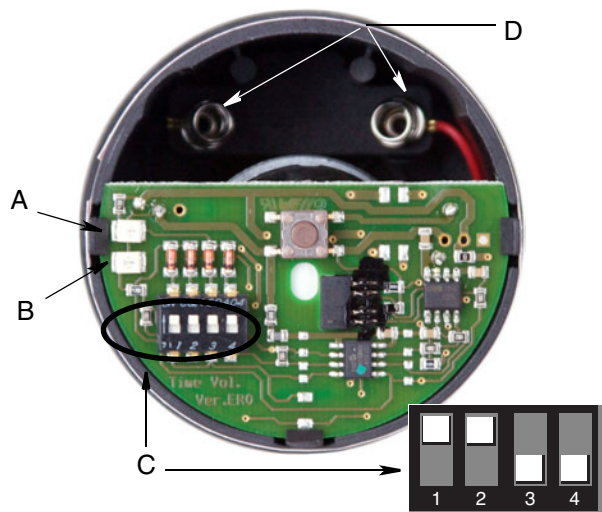


FIG. 3

- A LED Red
- B LED Green
- C 4-way code switch
- D battery pack contacts

Setting Dip Switches

1. Unscrew and remove the cover.

Setting the Discharge Period (TIME)

2. Use a small screwdriver or your finger to move dip switches to the desired position. Refer to FIG. 4.
 - The discharge period is pre-set to 6 months.
 - Dip switches 1+2 marked "TIME" are used to set the discharge period.
 - In FIG. 4 the white square indicates dip switch position.

Dip Switch Position Options: Time

There are 4 switch position options: 1, 3, 6 and 12 months. Refer to FIG. 4 for correct position for each option.

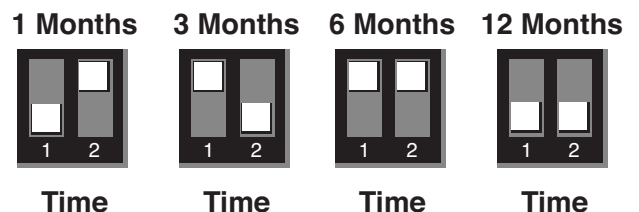


FIG. 4

Setting the Lubrication Canister Volume

3. Use a small screwdriver or your finger to move dip switches to the desired position. Refer to FIG. 5.

- Dip switches 3+4 marked “VOL” are used to set the lubrication canister size. If the 4-way code switch does not correspond to the actual size of the lubrication canister, it will lead to a wrong signal and over or under lubrication.
- In FIG. 5 the white square indicates dip switch position.

Dip Switch Position Options: Volume

There are 3 switch position options. These positions correspond to each of the 3 lubrication canister sizes: 60 cc, 120 cc, 250 cc. Refer to FIG. 5 for correct position for each option.

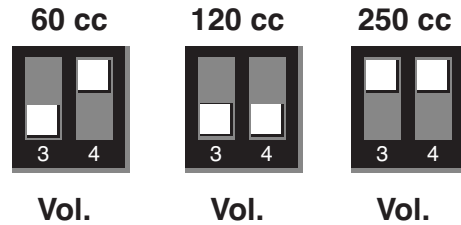









FIG. 5

TABLE 1: Dip Switch Settings

- Amount of discharge shown in cc (1cc = 0.9 gram lubricant) per day.
- The white square indicates dip switch position.

Lubrication Canister Size	60 cc	120 cc	250 cc	Discharge period
Dip Switch Position	 VOL	 VOL	 VOL	
 TIME	2.00	4.00	8.33	1 month
 TIME	0.67	1.33	2.78	3 months
 TIME	0.33	0.67	1.39	6 months
 TIME	0.17	0.33	0.69	12 months

Changing the Dip Switch Setting

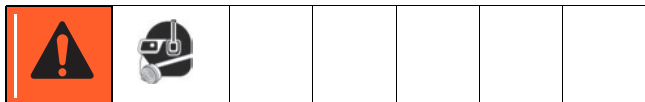
The discharge period (Time) and/or lubrication canister size (Volume) can only be changed when a new lubrication canister is attached. If settings must be changed during current operation; i.e., after discharge was started, you must attach a new, completely filled lubrication canister **and** a new battery pack.

Changing settings during operation interferes with the controls and monitoring electronics; making it impossible to guarantee precise lubrication.

Always use a new, completely full lubrication canister and new battery pack after each setting change. Never use a partially empty lubrication canister or old batteries.

Selecting Mounting Location

Installation Guidelines



- Before installing the lubricator, the lubrication points and any extensions must be adequately pre-lubricated with the same lubricant contained in the lubricator. A 400 gram lubricant cartridge for grease guns is available from Graco. See Parts, page 16 for a complete list of available lubricant cartridges.
- Install one lubricator per lubrication point.
- When oil is used for lubrication, a non-return valve (oil throttle) must be installed. This will prevent oil leakage from the lubricator. An oil throttle, part number 124102 is available from Graco. See Parts, page 16.
- An oil-filled lubricator must be installed vertically (outlet down).

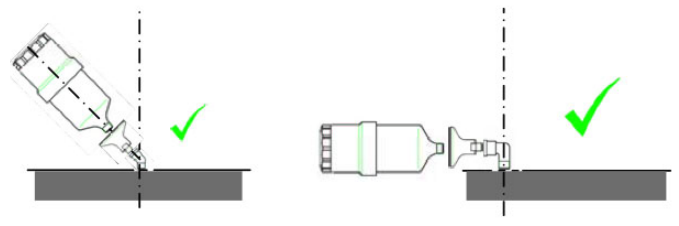
- For horizontal mounting a bracket clip must be used to hold the lubricator in place. A horizontal clip bracket part number 124086 is available from Graco. See Parts, page 16
- For vertical installations always use a support adapter part number 124105 is available from Graco. See Parts, page 16.
- The grease nozzle of the lubricator has a npt 1/4 inch male thread. If your application has a different thread you may need to use an adapter. See Parts, page 16 for a complete list of available adapters.
- Do not overtighten the plastic thread of the lubricator.
- For all metal to metal connections (i.e., extensions, reducers, etc.) make sure to use LOCTITE® 243* (semi-tight screw locking).

*Loctite® is a registered trademark of the Loctite Corporation.

Direct Mounting Installation

Refer to FIG. 6 for examples of correct and incorrect direct mounting installations.

Correct



Incorrect

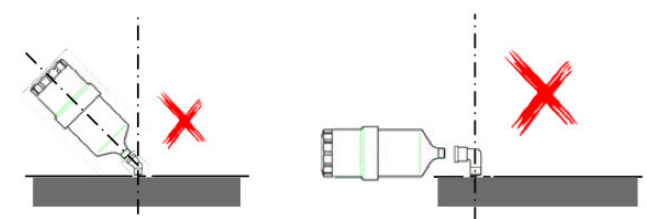
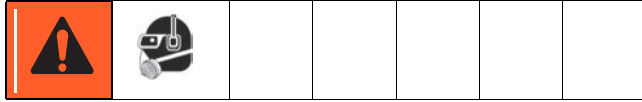


FIG. 6

Remote Mounting Installations

Refer to FIG. 7 and FIG. 8 for examples of correct remote mounting installations.



- Remote installations require a grease line. Graco recommends using a 5/16 inch flexible hose.
- Select a position for the lubricator that is easy to access and protected from high-pressure water jets, falling materials, corrosive chemicals and extreme temperatures.

Grease Lubrication with Tube

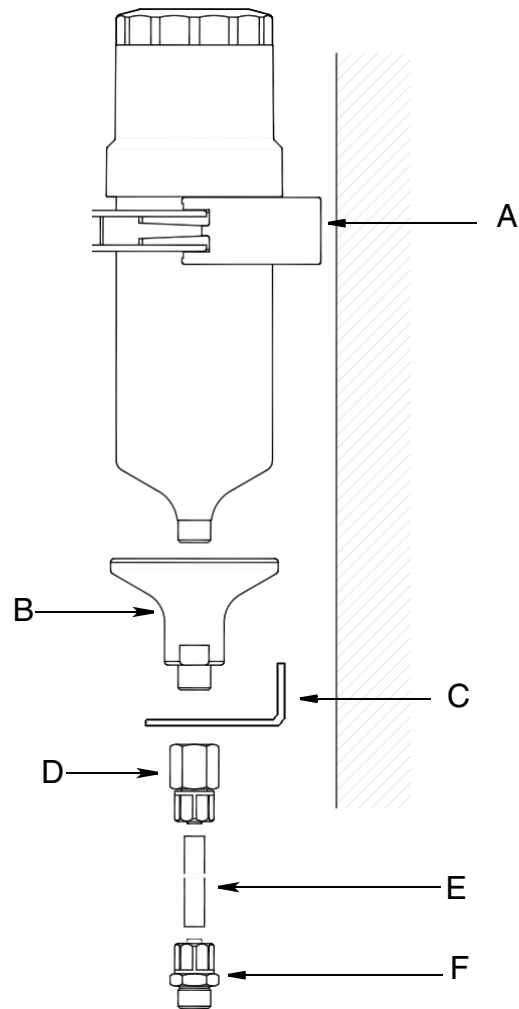


FIG. 7

- A Clip, 124086
- B Support adapter, 124105
- C Bracket, 124087
- D Tube connector◆, (User supplied)
- E Nylon tube◆ (User supplied)
- F Tube connections◆ (User supplied)

◆ *Must be at least 5/16 inch diameter tube.*

From-top-lubrication of a Chain with Oil

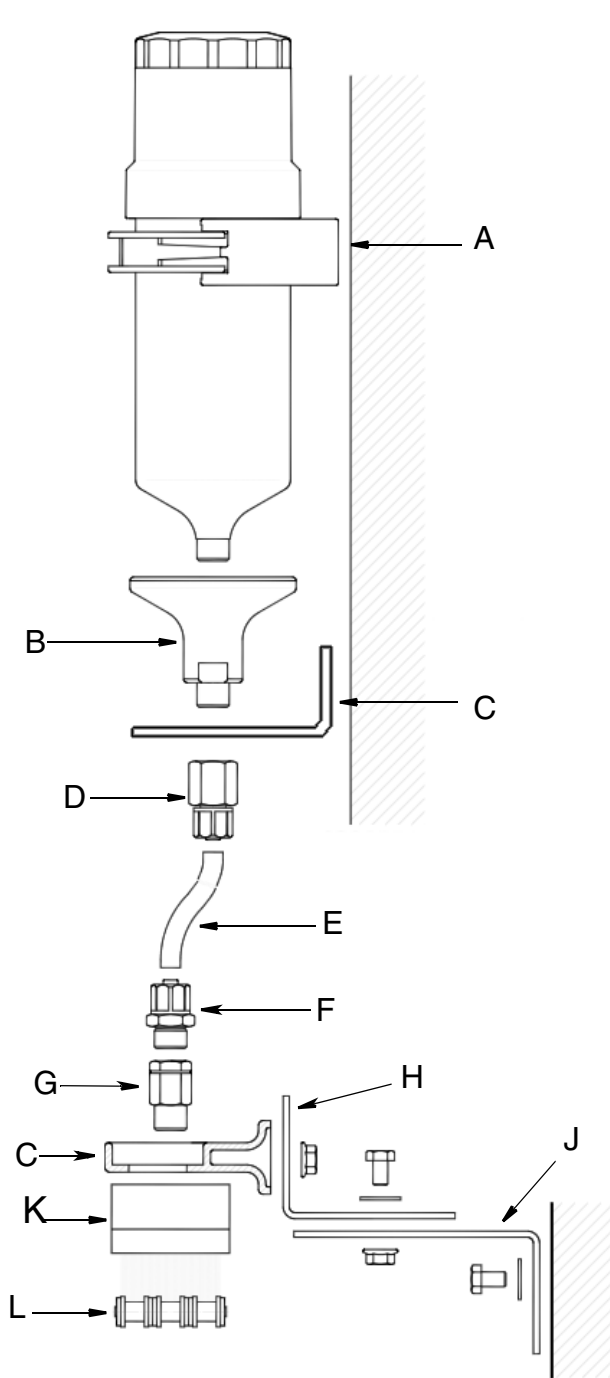


FIG. 8

- A Clip, 124086
- B Support adapter, 124105
- C Bracket, 124087
- D Tube connector◆ (User supplied)
- E Nylon tube◆ (User supplied)
- F Tube connections◆ (User supplied)
- G Oil throttle, 124102*
- H L-Bracket, 124098
- J Bulkhead mounting plate, 124099
- K Oil brush, 1"x 1.5", 124090
- L Chain

**The non-return valve (oil throttle (G)) should always be placed at the lowest point of the application.*

◆ *Must be at least 5/16 inch diameter tube.*

Installing Lubricator to Lubrication Point

1. Clean the lubrication point to remove any potential contaminants.
2. Verify the thread of the lubricator corresponds to the thread of the screw point.
3. Verify Dip Switches are correctly set. See Table 1, page 8.
4. Prime the grease line and all accessories with the same grease that is contained in the lubricator (See Parts, page 16 for a complete list of available grease cartridges).
5. Install reducers, extensions, grease line, etc. (if necessary).
6. Place drive unit on top of new lubrication canister until the teeth of both pieces are locked.
7. Screw the cover of the drive unit onto the lubrication canister - hand tighten only.
8. (If the plug is not already removed), remove the plug (A).



9. Install lubricator unit into adapter (B) (if it is not already installed).
10. Screw lubricator to lubrication point, hand tight only.



NOTICE

To ensure optimal lubrication:

- Seal threads of all connecting parts with a suitable, standard sealant.
- Mount oil filled lubricators properly with the outlet pointing down.
- Never screw in the lubricator a second time or the self-sealing threads will be damaged.
- For remote mounting installations, make sure bracket does not squeeze the lubrication canister as this could block the piston inside the canister.

Operation

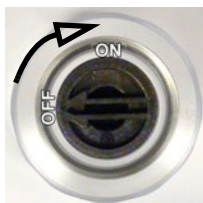
Before operation verify:

- The lubricator does not have any visible damage.
- The lubricator canister is filled with the requested grease or oil.
- For oil filled lubrication canisters, an oil throttle must be attached.
- New batteries have been installed.
- The “VOL” switches 3 and 4 of the 4-way code switch match the correct size of the lubrication canister.

- The “TIME” switches 1 and 2 of the 4-way code switch in the drive unit match the desired discharge period.
- All components are properly assembled and screwed together hand tight.

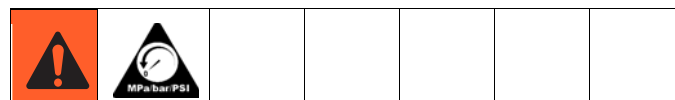
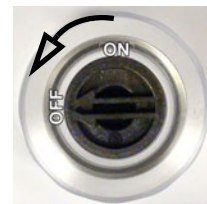
To begin the discharge:

Turn the rotary switch from the OFF position to the ON position.



Removing Lubrication Canister

1. Switch the rotary switch position from ON to OFF.



2. To disconnect adapter from lubrication point, follow **pressure relief procedure** provided **on** page 4.
3. Unscrew and completely remove adapter (B) from the lubricator. Adapter will be reused.

Maintenance

Changing the Lubrication Canister

When the red and green LED light up at the same time, the lubrication canister is empty and should be replaced.



NOTICE
<ul style="list-style-type: none"> • The battery pack must be replaced every time you change a lubrication canister to ensure correct lubricator operation. • The drive unit and circuit board must always be protected from moisture to prevent damaging these components. Always change the lubrication canister in a dry place.



FIG. 9

4. Unscrew cover from drive unit.
5. Remove drive unit from the lubrication canister.
6. Remove old battery pack from drive unit.

Installing the New Lubrication Canister

						
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Sparking can occur when changing the battery pack. Only replace the battery pack in a non-hazardous location, away from flammable fluids or fumes.

1. Install new battery pack in drive unit in the direction of the arrows as shown in FIG. 10.

NOTE: Only replace the battery pack with a Graco battery pack for EM Drive Lubricators, part number 124261. Handle and dispose of the battery pack properly.



FIG. 10

2. If a different size lubrication canister or discharge period is going to be used, change dip switches to reflect the new canister size and/or time change. See Table 1, page 8.
3. Prime the grease line and all accessories with the same grease that is contained in the lubricator (See Parts, page 16 for a complete list of available grease cartridges).
4. Install reducers, extensions, grease line, etc. (if necessary).
5. Place drive unit on top of new lubrication canister until the teeth of both pieces are locked.
6. Screw the cover of the drive unit onto the lubrication canister - hand tighten only.

7. Remove the plug (A).



8. Install lubricator unit into adapter (B).



9. Screw lubricator into the lubrication point - hand tighten only.

NOTICE
<p>To ensure optimal lubrication:</p> <ul style="list-style-type: none"> • Seal threads of all connecting parts with a suitable, standard sealant. • Mount oil filled lubricators properly with the outlet pointing down. • Never screw in the lubricator a second time or the self-sealing threads will be damaged. • For remote mounting installations, make sure bracket does not squeeze the lubrication canister as this could block the piston inside the canister.

10. To begin the discharge refer to Operation, page 12.

Lubrication Canister Disposal



Dispose of hazardous fluid in approved containers, and according to applicable guidelines. Read the MSDS to know the specific hazards of the fluids you are using.

Storage

When lubricators are not immediately installed, they must be stored for a maximum of 1 year in a dry, dust free, sunlight protected room, indoors. The room temperature cannot exceed 70°F (21°C).

Troubleshooting

Malfunction	Possible Cause	Solution
Lubricator does not function	Switches on the cover are in the OFF position	Move switches to ON position
	No batteries are installed in the drive unit	Install new battery pack
	Old batteries were used	Install new battery pack
	Batteries are leaking	Replace drive unit
	Parts are not correctly screwed together	Correctly screw parts together or screw tighter
The red and green blinking LED display signals “end of discharge period” but lubrication unit is not empty yet	Settings were changed during the currently running operation or adjusted wrong at the beginning	Replace with full lubrication canister. Install new battery pack and restart.
Unit does not discharge	Old batteries were used	Install new battery pack
	Unit has been operating below -10°C (14°F) for a long period of time	Operate the unit within the specified temperature range
	Settings were changed during the currently running operation or adjusted wrong at the beginning	Replace with full lubrication canister. Install new battery pack and restart.
The green blinking LED display signals “system in operation” but the lubrication unit is empty	Settings were changed during the currently running operation or adjusted wrong at the beginning	Replace with full lubrication canister. Install new battery pack and restart.
The red blinking LED display signals “system malfunction”	Clogged line and/or connection parts	Clean line and connection parts. Turn unit OFF and then ON again.
	Counter-pressure is too high	Lower counter-pressure

Parts

Miscellaneous Accessories

Part No.	Description	Qty.
123949	MOTOR, EM-Drive	1
124086	CLIP, support	1
124087	BRACKET, plastic	1
124089	BRUSH, pig hair, 1/4 fnpt - 3/4	1
124090	BRUSH, oil, 1 x 1.5	1
124091	BRUSH, oil, 1 x 2.4	1
124092	BRUSH, oil, 1 x 4	1
124093	BRUSH, link chain	1
124100	CLAMP, beam, 1"	1
124101	BRACKET, dual unit	1
124102	VALVE, check, oil throttle	1
124109	KIT, accessory, purge	1
124110	CAP, wet, EM-Drive	1
124111	CAP, full, 60 - 120 cc	1
124112	CAP, full, 250 cc	1
124113	APPLICATOR, chain, felt	1
124114	BRUSH, nylon, 1/8 mnpt x 5/8	1
124115	BRUSH, nylon, 1/8 mnpt x 2	1
124116	KIT, SA heavy green	1
124119	PADDLE, open gear lube	1

Mounting Brackets

Part No.	Description	Qty.
124094	BRACKET, mounting, small	1
124095	BRACKET, mounting, medium	1
124096	BRACKET, mounting, large	1
124097	BRACKET, mounting, flat	1
124098	BRACKET, mounting, L	1
124099	BRACKET, mounting, bulkhead	1

Fitting Adapter

Part No.	Description	Qty.
124105	ADAPTER, 1/4 fnpt x 1/4 mnpt	1
124106	ADAPTER, 1/4 fnpt x 1/8 mnpt	1

Pressure Relief Valve

Part No.	Description	Qty.
124107	VALVE, relief, 1/8 m, 5 lb	1
124108	VALVE, relief, 1/8 m, 1 lb	1

Replacement Cap

Part No.	Description	Qty.
124110	CAP, top	1
124111	CAP, full, 60-120 cc	1
124112	CAP, full, 250 cc	1

400 Gram Lubricant Cartridges

Part No.	Description	Qty.
124176	CARTRIDGE, lubricant, lithium EP-2	1
124177	CARTRIDGE, lubricant, construction	1
124178	CARTRIDGE, lubricant, bearing	1
124179	CARTRIDGE, lubricant, milling	1
124180	CARTRIDGE, lubricant, food grade H1	1
124181	CARTRIDGE, lubricant, synthetic industrial	1
124182	CARTRIDGE, lubricant, ultra spindle	1
124183	CARTRIDGE, lubricant, lithium EP-1	1

Refill Kits

Part No.	Description	Qty.	Part No.	Description	Qty.
24E582	KIT, refill, 60 cc, lithium EP-2	1	24E597	KIT, refill, 120 cc, lithium EP-1	1
24E583	KIT, refill, 60 cc, construction	1	24E598	KIT, refill, 250 cc, lithium EP-2	1
24E584	KIT, refill, 60 cc, bearing	1	24E599	KIT, refill, 250 cc, construction	1
24E585	KIT, refill, 60 cc, milling	1	24E600	KIT, refill, 250 cc, bearing	1
24E586	KIT, refill, 60 cc, food grade H1	1	24E601	KIT, refill, 250 cc, milling	1
24E587	KIT, refill, 60 cc, synthetic	1	24E602	KIT, refill, 250 cc, food grade H1	1
24E588	KIT, refill, 60 cc, ultra spindle	1	24E603	KIT, refill, 250 cc, synthetic	1
24E589	KIT, refill, 60 cc, lithium EP-1	1	24E604	KIT, refill, 250 cc, ultra spindle	1
24E590	KIT, refill, 120 cc, lithium EP-2	1	24E605	KIT, refill, 250 cc, lithium EP-1	1
24E591	KIT, refill, 120 cc, construction	1	24H340	KIT, refill, 120 cc, EM bearing	1
24E592	KIT, refill, 120 cc, bearing	1	24H341	KIT, refill, 250 cc, EM bearing	1
24E593	KIT, refill, 120 cc, milling	1			
24E594	KIT, refill, 120 cc, food grade H1	1			
24E595	KIT, refill, 120 cc, synthetic	1			
24E596	KIT, refill, 120 cc, ultra spindle	1			

Technical Data

Power Supply	3 AA, 1.5V batteries
Temperature range	-10° C to +50° C (+14° F to +122° F)
Maximum output pressure	5 bar (75 psi)
Storage	
Conditions	Dry, dust free
Temperature	+20° C ± 5° C (+68° F ± 9° F)

Noise data: Sound pressure level <70 dB(A) measured at distance of 1m (39.4 in.) / height 1.6m (63 in.)

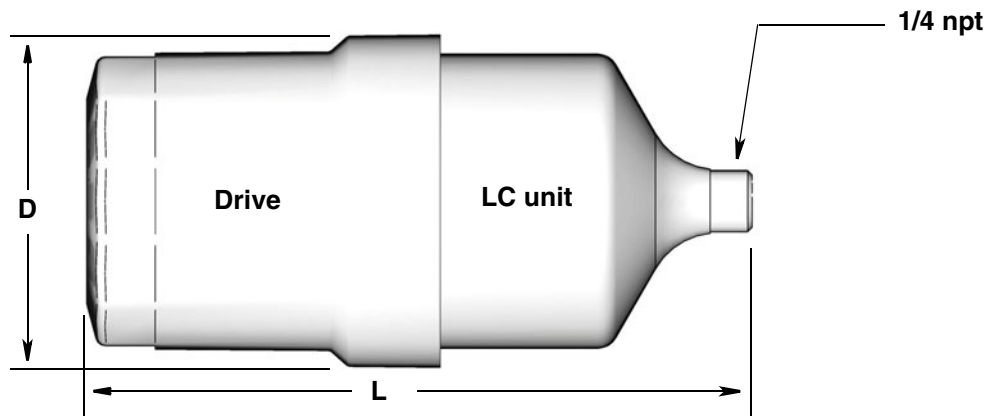
Loctite® is a registered trademark of the Loctite Corporation.

Discharge Amount per Cycle

Discharge Period	Pause Time	Discharge Amount per Discharge Cycle					
		EM-60		EM-120		EM-250	
Months	h:min	cm ³	fl. oz.	cm ³	fl oz.	cm ³	fl. oz.
1	1:30	0.13	0.004	0.26	0.008	0.53	0.17
3	4:37						
6	9:17						
12	18:36						

Weights and Measurements

Type	Volume		Diameter (D)		Length (L)		Weight (empty)	
	cm ³	fl. oz	mm	in.	mm	in.	kg	lbs
EM-60	60	2.03	71	2.8	142	5.60	0.376	0.829
EM-120	120	4.06	71	2.8	165	6.50	0.386	0.851
EM-250	250	8.45	71	2.8	215	8.46	0.417	0.919



Graco Standard Warranty

Graco warrants all equipment referenced in this document which is manufactured by Graco and bearing its name to be free from defects in material and workmanship on the date of sale to the original purchaser for use. With the exception of any special, extended, or limited warranty published by Graco, Graco will, for a period of twelve months from the date of sale, repair or replace any part of the equipment determined by Graco to be defective. This warranty applies only when the equipment is installed, operated and maintained in accordance with Graco's written recommendations.

This warranty does not cover, and Graco shall not be liable for general wear and tear, or any malfunction, damage or wear caused by faulty installation, misapplication, abrasion, corrosion, inadequate or improper maintenance, negligence, accident, tampering, or substitution of non-Graco component parts. Nor shall Graco be liable for malfunction, damage or wear caused by the incompatibility of Graco equipment with structures, accessories, equipment or materials not supplied by Graco, or the improper design, manufacture, installation, operation or maintenance of structures, accessories, equipment or materials not supplied by Graco.

This warranty is conditioned upon the prepaid return of the equipment claimed to be defective to an authorized Graco distributor for verification of the claimed defect. If the claimed defect is verified, Graco will repair or replace free of charge any defective parts. The equipment will be returned to the original purchaser transportation prepaid. If inspection of the equipment does not disclose any defect in material or workmanship, repairs will be made at a reasonable charge, which charges may include the costs of parts, labor, and transportation.

THIS WARRANTY IS EXCLUSIVE, AND IS IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.

Graco's sole obligation and buyer's sole remedy for any breach of warranty shall be as set forth above. The buyer agrees that no other remedy (including, but not limited to, incidental or consequential damages for lost profits, lost sales, injury to person or property, or any other incidental or consequential loss) shall be available. Any action for breach of warranty must be brought within two (2) years of the date of sale.

GRACO MAKES NO WARRANTY, AND DISCLAIMS ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, IN CONNECTION WITH ACCESSORIES, EQUIPMENT, MATERIALS OR COMPONENTS SOLD BUT NOT MANUFACTURED BY GRACO. These items sold, but not manufactured by Graco (such as electric motors, switches, hose, etc.), are subject to the warranty, if any, of their manufacturer. Graco will provide purchaser with reasonable assistance in making any claim for breach of these warranties.

In no event will Graco be liable for indirect, incidental, special or consequential damages resulting from Graco supplying equipment hereunder, or the furnishing, performance, or use of any products or other goods sold hereto, whether due to a breach of contract, breach of warranty, the negligence of Graco, or otherwise.

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Graco Information

For the latest information about Graco products, visit www.graco.com.

TO PLACE AN ORDER, contact your Graco distributor or call to identify the nearest distributor.

Phone: 612-623-6928 or **Toll Free:** 1-800-533-9655, **Fax:** 612-378-3590

*All written and visual data contained in this document reflects the latest product information available at the time of publication.
Graco reserves the right to make changes at any time without notice.*

Original instructions. This manual contains English. MM 3A0415

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